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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,099	11/26/2003	Toshihiko Okamura	Q78646	6194

23373 7590 01/08/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037	**EXAMINER** RIZK, SAMIR WADIE

ART UNIT	PAPER NUMBER
2133	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 September 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-16* is/are allowed.

6)☒ Claim(s) *17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

- Response to the applicant's amendment dated 9/29/2006

- Amended claims 1-22 have been submitted for examination

- Amended claims 1-16 have been allowed

- Amended claims 17-22 have been rejected

Title

1. In view of the applicant-amended title, filed on 9/29/2006 all objections to the title are withdrawn.

Applicant Interview

2. In a telephone interview with attorney Howard Bernstein 12/28/2006, Applicant agreed to amend claims 1 and 10 as follows:

3. Change claim 1, line 11, and the "nasis "to" basis.

4. Change claim 10, line 1, the "A program to cause" to "A program stored on a computer readable medium to cause".

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claim 17 is rejected under 35 U.S.C. 101 because the claim invention is directed to non-statutory subject matter. Each limitation in claim 17 is an abstract algorithm that can be carried by hand or computer software program element and

is not tangibly embodied. Abstract algorithms are non-statutory. Claimed

algorithms must be <u>tangible, useful and concrete.</u>

Claim17 recites:

- (currently amended) An error correcting code decoding method on a

  basis of Message-Passing decoding on a Low-Density Parity-Check

  Code, comprising:

- **generating an address** of a memory storing a received value and a

  message generated during said decoding on a basis of a plurality of

  permutations; and

- **connecting a plurality of variable node** functions in said decoding

  and a plurality of check node functions in said decoding on a basis of a

  permutation changed in a same cycle as that of an address generation

  means.

6.   Claims 18-22 depend from claim 17.

Response to Arguments

7.   Applicant's arguments, see pages 11-13, filed on 9/29/2006, with respect to

claims 1,10 and 17 have been fully considered and are persuasive. The 102(e)

rejections of claims 1-22 have been withdrawn.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

8.   The prior Art of record and, in particular Richardson et al. US publication no.

2005/0278606 (Hereinafter Richardson) teaches:

-   An error correcting code decoding device based on Message-Passing

    decoding on a Low-Density Parity-Check Code, comprising:

-   a plurality of memory means for storing a received value and a

    message generated during said decoding;

-   a plurality of variable node function means which perform variable

    node processing in said decoding;

-   a plurality of check node function means which perform check node

    processing in said decoding;

-   a plurality of address generation means for generating an address of

    said memory means on the basis of the first permutation matrix is said

    sub-matrix of a Kronecker product; and

-   a plurality of shuffle network means for determining a connection

    between said variable node function means with said current check

    node processing.

However, the prior art do not teach, suggest, or otherwise render obvious:

-   An error correcting code decoding device based on Message-Passing

    decoding on a Low-Density Parity-Check Code, whose parity-check

    matrix consists of sub-matrices of a Kronecker product of two

    permutation matrices, comprising:

- a plurality of memory means for storing a received value and a message generated during said decoding;

- a plurality of variable node function means which perform variable node processing in said decoding;

- a plurality of check node function means which perform check node processing in said decoding;

- a plurality of address generation means for generating an address of said memory means on the basis of the first permutation matrix is said sub-matrix of a Kronecker product; and

- a plurality of shuffle network means for determining a connection between said variable node function means on the basis of the second permutation matrix in said sub-matrix of a Kronecker product;

- wherein said check node functions(s) means perform(s) check node processing **sequentially** on a unit of said second permutation matrix, and said variable node functions generate messages in accordance with said current check node processing.

9.   Claims (2-9) depend from claim 1.

10.   Claims 10 and 17 have similar language to claim 1.

11.   Claims (11-16) depend from claim 10.

12.   Claims (18-22) depend from claim 17.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F. 8-5.
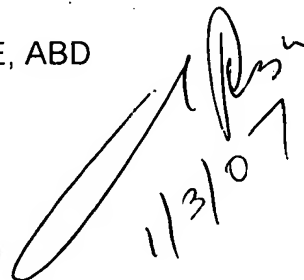
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free)

Sam Rizk, MSEE, ABD

Examiner

ART UNIT 2133

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